

## CLAIMS

What is claimed is:

1. A portable reflex comparator for testing the quality of a retroreflector part comprising:
  - a housing with first and second end walls, side walls, and a handle for carrying the housing;
  - a light source located at one end of the housing;
  - a light modulating device spaced apart from the light source;
  - a focal plane offset from the light modulating device;
  - a collimating lens positioned parallel to the focal plane;
  - a signal detector for detecting a reference signal;
  - a lock-in amplifier for filtering out noise and light; and
  - a meter operable to output a signal indicative of the part being tested.
2. The portable reflex comparator as claimed in claim 1 further comprising a first fiber optic line extending between the detector and the focal plane, the line being operable to transmit an input signal from the lens to the detector.
3. The portable reflex comparator as claimed in claim 1 further comprising a second fiber optic line extending between the detector and the light modulating device, the line being operable to transmit a reference signal from the modulating device to the detector.
4. The portable reflex comparator as claimed in claim 1 further comprising a third fiber optic line extending between the focal plane and the light modulating device, the

line being operable to transmit an output signal from the modulating device to the detector.

5. The portable reflex comparator as claimed in claim 1 further comprising a reflex part holder for holding a part that is to be tested.

6. The portable reflex comparator as claimed in claim 1, wherein the light modulating device is a fan that is operable to fragment a beam of light from the light source so as to modulate the beam of light to about 3000 hertz.

7. The portable reflex comparator as claimed in claim 1, where the light modulating device is an electronically modulated laser diode.

8. The portable reflex comparator as claimed in claim 1, wherein the collimating lens is operable to receive a diverging beam of light, direct said beam of light substantially normal to the surface of a reflex part, receive the light beam back from the reflex part and converge the light beam to the focal plane.

9. A portable reflex comparator comprising:

- a housing having a handle for carrying the comparator;
- a light modulating device located within the housing;
- a focal plane offset from the light modulating device;
- a collimating lens positioned parallel to the focal plane;
- a lock-in amplifier for filtering out external noise; and
- a meter operable to create a signal indicative of the part being tested.

10. The portable reflex comparator as claimed in claim 8 further comprising a detector for determining a reference signal.

11. The portable reflex comparator as claimed in claim 8 further comprising a part holder located on an end of the housing.

12. The portable reflex comparator as claimed in claim 8 wherein the light modulating device is a rotating fan.

13. The portable reflex comparator as claimed in claim 8 wherein the light modulating device is an electronically modulated laser diode.

14. The portable reflex comparator as claimed in claim 8 wherein the light modulating device is an electrically modulated laser diode.

15. A method of testing a reflex part using a comparator comprising the steps of:

- a) providing a modulated light beam signal and splitting the signal into a reference signal and an output signal;
- b) directing the output signal to a focal plane;
- c) directing the reference signal to an amplifier;
- d) diverging the output signal to a collimating lens so as to create parallel beams of light engaging the surface of a reflex part to be tested;
- e) bouncing returning beams of light onto the collimating lens and directing the returning beams to an input fiber optic member located at the focal plane to create an input signal;
- f) transmitting the input signal from the focal plane to an amplifier;
- g) processing the input signal and the reference signal so as to create a voltage output indicative of the light characteristic of the reflex part; and

h) indicating on an output device value x which is indicative of the light characteristic of a standardized reflex part.

16. The method of testing a reflex part as claimed in claim 15 further comprising the steps of:

i) removing the reflex part that was tested and inserting a new reflex part into the comparator;

j) repeating steps b – g;

k) indicating on an output device value y which is indicative of the light characteristic of the reflex part being tested from a production line;

l) compare the standardized value x to the value y.

17. A method of testing a part using a portable testing device comprising the steps of:

a) modulating a light beam to create a reference signal and an output signal;

b) processing the reference signal to determine its frequency;

c) reflecting the output signal through a lens and onto a part and back to an input sensor to create an input signal; and

d) processing the input signal and the reference signal through an amplifier and generating a meter reading of X which is indicative of the light quality of the part.

18. The method as claimed in claim 17 further comprising the steps of:

e) testing a new part by repeating steps b - d; and

f) comparing the value X of step d with the value X of step e.

19. The method as claimed in claim 17 wherein the step of modulating a light beam is accomplished electronically by a laser diode.

20. The method as claimed in claim 17 further comprising the step of filtering out excess noise so as to make the testing device operable in the open environment of a factory.